


GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

MEMORANDUM

DATE: November 14, 2011  
TO: Chris Lanane, Scott Weaver  
FROM: Mike Horn   
SUBJECT: Quality Assurance Audit Report

Attached is the draft version of the document, "Great Basin Unified Air Pollution Control District Quality Assurance Audit Report, Stanley Site, November 14, 2011," for your review. Please refer any comments you may have on the document to me by January 16, 2012. If no comments are received by that date, the report will be considered final.

Thank you for your cooperation in this matter.

Great Basin Unified Air Pollution Control District  
Quality Assurance  
Audit Report

**SITE:**  
**STANLEY SITE**

Report Date: November 14, 2011  
Prepared by: Mike S. Horn

## 1.0 Introduction

As part of the Great Basin Unified Air Pollution Control District's (District) quality assurance (QA) program, periodic audits are conducted on the monitoring stations throughout the District. These checks, which are conducted by personnel other than those associated with the day-to-day operation and maintenance of the stations, provide additional assurance that the data collected are of high quality and meet the project objectives. The achievement of these objectives can be determined, in part, by establishing criteria within which monitoring equipment is to be operated and then testing that equipment regularly to verify its operation within those criteria.

In keeping with the District's QA program goals, the T.E.O.M. PM-10 Monitoring Station at Stanley was audited on November 14, 2011. The audit was conducted by Mike Horn and was witnessed by Scott Weaver, who is the site operator.

## 2.0 Parameters Audited:

T.E.O.M. PM-10

## 3.0 Results and Actions

The results of the audit are summarized below. Any problems found are addressed under the heading, "Action," and are given below. Sensor responses not specifically addressed below responded within the audit criteria limits. The audit data are presented in detail in Appendix A. The certifications of the audit devices are presented in Appendix B. Audit criteria based on Title 40 code of Federal Regulations Part 58, Appendix A (October 2006), the USEPA Quality Assurance Handbook for Air Pollution Measurement Systems Volumes II, 1997, and IV, 2007, and/ or on the manufactures recommendations, are presented in table A-1.

## 4.0 Recommendations and Comments

There are no recommendations or comments at this time.

## APPENDIX A

Great Basin Unified Air Pollution Control District  
Tapered Element Oscillating Microbalance (TEOM)  
AUDIT

Date of report: 11/14/11	Site name: Stanley Site
Date: 11/14/11	Operator: Scott Weaver
Start: 10:40hrs. PST	Project: SB 270
Finish: 11:00hrs. PST	Site Elevation: N/A ft.
Audited By: Mike Horn	Amb. Pres.: 890.70 hPa
Witness: Scott Weaver	Amb. Temp.: 20.8 deg. C
Prop. or Serial No.: 793/23573	Make: R & P
Type: PM-10	Model: 1400ab
	Last cal. date: 10/6/11

AUDIT DEVICE(S)

Make: BGI Incorporated  
Model: DELTA CAL  
S/N: 525  
Range: 2 - 20 lpm

Calibration Factors

Slope: 1.00  
Intercept: 0.00  
Cal Date: 12/22/10 Date of first use 1/12/11

Make: BGI Incorporated  
Model: DELTA CAL  
S/N: 123  
Range: 2 - 20 lpm

Slope: Calibration Factors

Intercept: 1.00  
Cal Date: 0.00  
12/22/10

	Main:	Aux:	Sampler temp:	<u>Diff.</u>	Sampler press:	<u>Diff.</u>
Leak check:	0.110	0.270	21.1	0.3	886.38	-4.3
Pump off leak check:	N/A	N/A				

$$Q_a = [dP \times T_a / P_a]^{1/2} + b$$

Audit Point	Audit Flow Rate,		Site Flow Rate (VLPM)	Diff. (%)	Nominal Flow Rates	
	$\Delta P$ , in. H <sub>2</sub> O	(VLPM)			Lower Limit (LPM)	Upper Limit (LPM)
Total Flow Rate	16.47	16.47	16.65	1.1	15.0	18.4
Bypass/Aux Flow Rate	13.42	13.42	13.66	1.8		
Main Flow Rate	2.97	2.97	2.99	0.7	2.7	3.3
Total Flow Rate	16.43	16.43	16.65	1.3	15.0	18.4

Comments: None.

TABLE A-1

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT  
QUALITY ASSURANCE PERFORMANCE AUDIT CRITERIA

<u>Measurement Variable</u>	<u>Evaluation Criteria</u>
Wind Speed	At $ws \leq 5$ m/s, input $\pm 0.25$ m/s; At $ws > 5$ m/s, input $\pm 5\%$ Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor and NRG Max 40H
Wind Direction	input $\pm 5^\circ$ Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor
Temperature	input $\pm 0.5^\circ$ C Gravimetry Lab $\pm 1.0$ deg. C input $\pm 2.0^\circ$ C for PM-10, PM-2.5 samplers
Relative Humidity	Ambient: input $\pm 5\%$ RH, $\pm 1.5^\circ$ C as dew point Gravimetry Lab: input $\pm 5\%$
Precipitation	input $\pm 10\%$
Barometric Pressure	Ambient: input $\pm 10$ hPa TEOM: $\pm 10$ mm mercury
PM-10: Hi-Vol SSL, Partisol, BGI, PM-2.5	input $\pm 10\%$ ; Design Flow $\pm 10\%$ input $\pm 4\%$ ; Design Flow $\pm 5\%$
TEOM: Total Flow Main Flow Bypass Flow	input $\pm 10\%$ ; Design Flow $\pm 10\%$ input $\pm 10\%$ ; Design Flow $\pm 10\%$ input $\pm 10\%$ ; Design Flow $\pm 10\%$
TEOM: Leak Check	Main Flow: $< 0.15$ LPM Bypass Flow: $< 0.60$ LPM

## Appendix B

### GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT QUALITY ASSURANCE CERTIFICATIONS OF AUDIT DEVICES

#### AUDIT DEVICE

	<u>Serial #</u>	<u>Cal Date:</u>	<u>Slope:</u>	<u>Intercept:</u>
BGI Delta CAL:	123	1/24/11	1.0	0.0
BGI Delta CAL:	525	1/4/11	1.0	0.0
Testo 735-1	01467895/712	12/16/10	1.0006	0.0209
Barigo Altimeter / Barometer:	P9	12/17/10	1.0	0.0
RM Young wind speed motor:	CU10, HS10	8/30/11	N/A	N/A
Psychro-Dyne Psychrometer:	RH 04	N/A	1 0	1 0
Texas Electronics FC-525 Precipitation:	52202	N/A		
Chinook Eng. Streamline FTS	108	9/8/10	0.41	0.6

**Great Basin Unified Air Pollution Control District  
Tapered Element Oscillating Microbalance (TEOM)**

**FLOW AUDIT**

Date: 4/14/11  
Start: 13:05  
Finish: 13:25

PST  
PST

Site Name:  
Operator:  
Project:

Stantec  
Scott Weaver  
SB270

Site Elevation:

Amb. Press.:

Amb. Temp.:

ft  
in. Hg  
deg. C

20.8  
89.7

Prop. Or Ser. No.:

Type:

793/23573  
PM10

Make: R&P

Model: 1400a

Last Cal. Date:

10/6/11

Audit Device(s)

Make: BGI INCORPORATED

Model: DELTA CAL

S/N: 0123-525

Range: 2 - 20 lpm

Calibration factors:

Slope: 1.0

Int.: 0.0

Cal Date: 1/4/11

Make: BGI INCORPORATED

Model: DELTA CAL

S/N: 0123

Range: 2 - 20 lpm

Calibration factors:

Slope: 1.0

Int.: 0.0

Cal Date:

$$Q_s = m[dP \times T_s / P_s]^{1/2} + b$$

Altitude Correction Factor:

÷ 1013

Leak Check-Initial

Main:

Aux:

Leak Check-Final

Main:

Aux:

11  
27

Audit  
Point

Audit Flow Rate

delta P

(VLPM)

Site  
Flow Rate  
(VLPM)

Diff.  
(%)

Nominal Flow Rates  
Lower Limit  
(LPM)  
Upper Limit  
(LPM)

Total Flow Rate

Aux. Flow Rate

Main Flow Rate

Total Flow Rate

16.47

13.42

12.92

16.43

299/13

13.66

2.99

16.65

.66 = 16.65

15.0

18.4

2.7

3.3

15.0

18.4

Standard

Sampler

True

Raw

Amb Temp

Amb Press

21.1

875

886.38

28.8

890.7

Comments:


Calibrated By:

Mark [Signature]



GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

MEMORANDUM

DATE: July 20, 2011  
TO: Chris Lanane, Scott Weaver  
FROM: Mike Horn   
SUBJECT: Quality Assurance Audit Report

Attached is the draft version of the document, "Great Basin Unified Air Pollution Control District Quality Assurance Audit Report, Stanley Site, July 20, 2011," for your review. Please refer any comments you may have on the document to me by September 20, 2011. If no comments are received by that date, the report will be considered final.

Thank you for your cooperation in this matter.

Great Basin Unified Air Pollution Control District  
Quality Assurance  
Audit Report

**SITE:**  
**STANLEY SITE**

Report Date: July 20, 2011  
Prepared by: Mike S. Horn

## 1.0 Introduction

As part of the Great Basin Unified Air Pollution Control District's (District) quality assurance (QA) program, periodic audits are conducted on the monitoring stations throughout the District. These checks, which are conducted by personnel other than those associated with the day-to-day operation and maintenance of the stations, provide additional assurance that the data collected are of high quality and meet the project objectives. The achievement of these objectives can be determined, in part, by establishing criteria within which monitoring equipment is to be operated and then testing that equipment regularly to verify its operation within those criteria.

In keeping with the District's QA program goals, the T.E.O.M. PM-10 Monitoring Station at Stanley was audited on July 20, 2011. The audit was conducted by Mike Horn and was witnessed by Scott Weaver, who is the site operator.

## 2.0 Parameters Audited:

T.E.O.M. PM-10

## 3.0 Results and Actions

The results of the audit are summarized below. Any problems found are addressed under the heading, "Action," and are given below. Sensor responses not specifically addressed below responded within the audit criteria limits. The audit data are presented in detail in Appendix A. The certifications of the audit devices are presented in Appendix B. Audit criteria based on Title 40 code of Federal Regulations Part 58, Appendix A (October 2006), the USEPA Quality Assurance Handbook for Air Pollution Measurement Systems Volumes II, 1997, and IV, 2007, and/ or on the manufactures recommendations, are presented in table A-1.

## 4.0 Recommendations and Comments

There are no recommendations or comments at this time.

## APPENDIX A

Great Basin Unified Air Pollution Control District  
Tapered Element Oscillating Microbalance (TEOM)  
AUDIT

Date of report: 7/20/11	Site name: Stanley Site
Date: 7/20/11	Operator: Scott Weaver
Start: 10:40hrs. PST	Project: SB 270
Finish: 11:00hrs. PST	Site Elevation: N/A ft.
Audited By: Mike Horn	Amb. Pres.: 891.20 hPa
Witness: Scott Weaver	Amb. Temp.: 31.3 deg. C
Prop. or Serial No.: N/A	Make: R & P
Type: PM-10	Model: 1400ab
	Last cal. date: 6/7/11

AUDIT DEVICE(S)

Make: BGI Incorporated

Model: DELTA CAL

S/N: 525

Range: 2 - 20 lpm

Calibration Factors

Slope: 1.00

Intercept: 0.00

Cal Date: 12/22/10 Date of first use 1/12/11

Main: 0.100

Aux: 0.160

Sampler temp: 30.1

Diff. -1.2

Sampler press: 888.40

Diff. -2.8

Leak check: 0.100

Pump off leak check: N/A

$$Q_a = [dP \times T_a / P_a]^{1/2} + b$$

Make: BGI Incorporated

Model: DELTA CAL

S/N: 123

Range: 2 - 20 lpm

Slope: Calibration Factors

Intercept: 1.00

Cal Date: 0.00

12/22/10

Audit Point	Audit Flow Rate, $\Delta P$ , in. H <sub>2</sub> O (VLPM)		Site Flow Rate (VLPM)	Diff. (%)	Nominal Flow Rates	
					Lower Limit (LPM)	Upper Limit (LPM)
Total Flow Rate	16.99	16.99	16.66	-1.9	15.0	18.4
Bypass/ Aux Flow Rate	13.89	13.89	13.66	-1.7		
Main Flow Rate	3.09	3.09	3.00	-2.9	2.7	3.3
Total Flow Rate	17.04	17.04	16.66	-2.2	15.0	18.4

Comments: None.

TABLE A-1

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT  
QUALITY ASSURANCE PERFORMANCE AUDIT CRITERIA

<u>Measurement Variable</u>	<u>Evaluation Criteria</u>
Wind Speed	At $ws \leq 5$ m/s, input $\pm 0.25$ m/s; At $ws > 5$ m/s, input $\pm 5\%$ Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor and NRG Max 40H
Wind Direction	input $\pm 5^\circ$ Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor
Temperature	input $\pm 0.5^\circ$ C input $\pm 2.0^\circ$ C for PM-10, PM-2.5 samplers
Relative Humidity	Ambient: input $\pm 5\%$ RH, $\pm 1.5^\circ$ C as dew point Gravimetry Lab: input $\pm 5\%$
Precipitation	input $\pm 10\%$
Barometric Pressure	Ambient: input $\pm 10$ hPa TEOM: $\pm 10$ mm mercury
PM-10: Hi-Vol SSI, Partisol, BGI, PM-2.5	input $\pm 10\%$ ; Design Flow $\pm 10\%$ input $\pm 4\%$ ; Design Flow $\pm 5\%$
TEOM: Total Flow Main Flow Bypass Flow	input $\pm 10\%$ ; Design Flow $\pm 10\%$ input $\pm 10\%$ ; Design Flow $\pm 10\%$ input $\pm 10\%$ ; Design Flow $\pm 10\%$
TEOM: Leak Check	Main Flow: $< 0.15$ LPM Bypass Flow: $< 0.60$ LPM

## Appendix B

### GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT QUALITY ASSURANCE CERTIFICATIONS OF AUDIT DEVICES

<u>AUDIT DEVICE</u>	<u>Serial #</u>	<u>Cal Date:</u>	<u>Slope:</u>	<u>Intercept:</u>
BGI Delta CAL:	123	1/24/11	1.0	0.0
BGI Delta CAL:	525	1/4/11	1.0	0.0
Testo 735-1	01467895/712	12/16/10	1.0006	0.0209
Barigo Altimeter/Barometer:	P9	12/17/10	1.0	0.0
RM Young wind speed motor:	CUO1, HSO1	12/3/10	N/A	N/A
Cole-Parmer 3312-40 Psychrometer:	RH 03	12/10/04	Wet 1.0037 Dry 1.0059	Wet -0.0598 Dry -0.1518
Texas Electronics FC-525 Precipitation:	52202	N/A		
Chinook Eng. Streamline FTS	108	9/8/10	0.41	0.6

Great Basin Unified Air Pollution Control District  
Tapered Element Oscillating Microbalance (TEOM)  
FLOW AUDIT

Date: 7/20/11  
Start: 7:48  
Finish: 11:00

PST  
PST

Site Name: *Stam*  
Operator: *Scott Weaver*  
Project: SB270

Site Elevation: ft  
Amb. Press.: 891.2 in. Hg  
Amb. Temp.: 31.3 deg. C

Prop. Or Ser. No.: 793/23573  
Type: PM10

Make: R&P  
Model: 1400a  
Last Cal. Date: 6/7/11

Audit Device(s)

Make: BGI INCORPORATED  
Model: DELTA CAL  
S/N: 0123-525  
Range: 2 - 20 lpm

Calibration factors:  
Slope: 1.0  
Int.: 0.0  
Cal Date: 1/4/11

Make: BGI INCORPORATED  
Model: DELTA CAL  
S/N: 0123  
Range: 2 - 20 lpm

Calibration factors:  
Slope: 1.0  
Int.: 0.0  
Cal Date: 1/4/11

$$Q_a = m[dP \times T_a / P_a]^{1/2} + b$$

Altitude Correction Factor:  $\div 1013$

Leak Check-Initial Main: .10 Aux: .16  
Leak Check-Final Main: Aux:

Audit Point	Audit Flow Rate		Site Flow Rate (VLPM)	Diff. (%)	Nominal Flow Rates	
	delta P	(VLPM)			Lower Limit (LPM)	Upper Limit (LPM)
Total Flow Rate	16.99		3.00/13.66 = 16.66		15.0	18.4
Aux. Flow Rate	13.89		13.16			
Main Flow Rate	3.09		3.60		2.7	3.3
Total Flow Rate	17.04		16.66		15.0	18.4

	Sampler	Standard	
		True	Raw
Amb Temp	30.1		31.3
Amb Press	.877	888.40	891.2


Comments:

Calibrated By: *Mah*



GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

MEMORANDUM

DATE: April 21, 2011  
TO: Chris Lanane, Scott Weaver  
FROM: Mike Horn   
SUBJECT: Quality Assurance Audit Report

Attached is the draft version of the document, "Great Basin Unified Air Pollution Control District Quality Assurance Audit Report, Stanley Site, April 21, 2011," for your review. Please refer any comments you may have on the document to me by June 21, 2011. If no comments are received by that date, the report will be considered final.

Thank you for your cooperation in this matter.

Great Basin Unified Air Pollution Control District  
Quality Assurance  
Audit Report

**SITE:**  
**STANLEY SITE**

Report Date: April 21, 2011  
Prepared by: Mike S. Horn

## 1.0 Introduction

As part of the Great Basin Unified Air Pollution Control District's (District) quality assurance (QA) program, periodic audits are conducted on the monitoring stations throughout the District. These checks, which are conducted by personnel other than those associated with the day-to-day operation and maintenance of the stations, provide additional assurance that the data collected are of high quality and meet the project objectives. The achievement of these objectives can be determined, in part, by establishing criteria within which monitoring equipment is to be operated and then testing that equipment regularly to verify its operation within those criteria.

In keeping with the District's QA program goals, the T.E.O.M. PM-10 Monitoring Station at Stanley was audited on April 20, 2011. The audit was conducted by Mike Horn and was witnessed by Scott Weaver, who is the site operator.

## 2.0 Parameters Audited:

T.E.O.M. PM-10

## 3.0 Results and Actions

The results of the audit are summarized below. Any problems found are addressed under the heading, "Action," and are given below. Sensor responses not specifically addressed below responded within the audit criteria limits. The audit data are presented in detail in Appendix A. The certifications of the audit devices are presented in Appendix B. Audit criteria based on Title 40 code of Federal Regulations Part 58, Appendix A (October 2006), the USEPA Quality Assurance Handbook for Air Pollution Measurement Systems Volumes II, 1997, and IV, 2007, and/ or on the manufactures recommendations, are presented in table A-1.

## 4.0 Recommendations and Comments

There are no recommendations or comments at this time.

## APPENDIX A

Great Basin Unified Air Pollution Control District  
Tapered Element Oscillating Microbalance (TEOM)  
AUDIT

Date of report: 4/21/11  
Date: 4/20/11  
Start: 10:30hrs. PST  
Finish: 10:45hrs. PST  
Audited By: Mike Horn  
Witness: Scott Weaver

Site name: Stanley Site  
Operator: Scott Weaver  
Project: SB 270  
Site Elevation: N/A ft.  
Amb. Pres.: 887.20 hPa  
Amb. Temp.: 20.7 deg. C  
Make: R & P  
Model: 1400ab  
Last cal. date: 3/14/11

Prop. or Serial No.: N/A  
Type: PM-10

AUDIT DEVICE(S)

Make: BGI Incorporated  
Model: DELTA CAL  
S/N: 525  
Range: 2 - 20 lpm

Calibration Factors

Slope: 1.00  
Intercept: 0.00  
Cal Date: 12/22/10 Date of first use 1/12/11

Make: BGI Incorporated  
Model: DELTA CAL  
S/N: 123  
Range: 2 - 20 lpm

Slope: Calibration Factors

Intercept: 1.00  
Cal Date: 0.00  
12/22/10

	Main:	Aux:	Sampler temp:	<u>Diff.</u>	Sampler press:	<u>Diff.</u>
Leak check:	0.100	0.150	20.3	-0.4	884.35	-2.9
Pump off leak check:	N/A	N/A				

$$Qa=[dPxTa/Pa]^{1/2}+b$$

Audit Point	Audit Flow Rate, $\Delta P$ , in. H <sub>2</sub> O		Site Flow Rate (VLPM)	Diff. (%)	Nominal Flow Rates	
		(VLPM)			Lower Limit (LPM)	Upper Limit (LPM)
Total Flow Rate	17.06	17.06	16.66	-2.3	15.0	18.4
Bypass/ Aux Flow Rate	13.91	13.91	13.66	-1.8		
Main Flow Rate	3.09	3.09	3.00	-2.9	2.7	3.3
Total Flow Rate	17.14	17.14	16.66	-2.8	15.0	18.4

Comments: None.

## Appendix B

### GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT QUALITY ASSURANCE CERTIFICATIONS OF AUDIT DEVICES

#### AUDIT DEVICE

	<u>Serial #</u>	<u>Cal Date:</u>	<u>Slope:</u>	<u>Intercept:</u>
BGI Delta CAL:	123	1/24/11	1.0	0.0
BGI Delta CAL:	525	1/4/11	1.0	0.0
Testo 735-1	01467895/712	12/16/10	1.0006	0.0209
Barigo Altimeter/Barometer:	P9	12/17/10	1.0	0.0
RM Young wind speed motor:	CUO1, HSO1	12/3/10	N/A	N/A
Cole-Parmer 3312-40 Psychrometer:	RH 03	12/10/04	Wet 1.0037 Dry 1.0059	Wet -0.0598 Dry -0.1518
Texas Electronics FC-525 Precipitation:	52202	N/A		
Chinook Eng. Streamline FTS	108	9/8/10	0.41	0.6

TABLE A-1

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT  
QUALITY ASSURANCE PERFORMANCE AUDIT CRITERIA

<u>Measurement Variable</u>	<u>Evaluation Criteria</u>
Wind Speed	At $ws \leq 5$ m/s, input $\pm 0.25$ m/s; At $ws > 5$ m/s, input $\pm 5\%$ Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor and NRG Max 40H
Wind Direction	input $\pm 5^\circ$ Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor
Temperature	input $\pm 0.5^\circ$ C input $\pm 2.0^\circ$ C for PM-10, PM-2.5 samplers
Relative Humidity	Ambient: input $\pm 5\%$ RH, $\pm 1.5^\circ$ C as dew point Gravimetry Lab: input $\pm 5\%$
Precipitation	input $\pm 10\%$
Barometric Pressure	Ambient: input $\pm 10$ hPa TEOM: $\pm 10$ mm mercury
PM-10: Hi-Vol SSI, Partisol, BGI, PM-2.5	input $\pm 10\%$ ; Design Flow $\pm 10\%$ input $\pm 4\%$ ; Design Flow $\pm 5\%$
TEOM: Total Flow Main Flow Bypass Flow	input $\pm 10\%$ ; Design Flow $\pm 10\%$ input $\pm 10\%$ ; Design Flow $\pm 10\%$ input $\pm 10\%$ ; Design Flow $\pm 10\%$
TEOM: Leak Check	Main Flow: $< 0.15$ LPM Bypass Flow: $< 0.60$ LPM

**Great Basin Unified Air Pollution Control District  
Tapered Element Oscillating Microbalance (TEOM)**

**FLOW AUDIT**

Date: 4/21/11  
Start: 10:30  
Finish: 10:45

PST  
PST

Site Name: *Stanley*  
Operator: *Scotty Weave*  
Project: SB270

Site Elevation: ft  
Amb. Press.: 887.2 in. Hg  
Amb. Temp.: 20.7 deg. C

Prop. Or Ser. No.: 793/23573  
Type: PM10

Make: R&P  
Model: 1400a  
Last Cal. Date: 3/14/11

**Audit Device(s)**

Make: BGI INCORPORATED  
Model: DELTA CAL  
S/N: 0123 525  
Range: 2 - 20 lpm

**Calibration factors:**

Slope: 1.0  
Int.: 0.0  
Cal Date: 1/4/11

Make: BGI INCORPORATED  
Model: DELTA CAL  
S/N: 0123  
Range: 2 - 20 lpm

**Calibration factors:**

Slope: 1.0  
Int.: 0.0  
Cal Date: -

$$Q_a = m[dP \times T_a / P_a]^{1/2} + b$$

Altitude Correction Factor:  $\div 1013$

Leak Check-Initial Main: .10  
Leak Check-Final Main: .10

Aux: .15  
Aux: .15

Audit Point	Audit Flow Rate		Site Flow Rate (VLPM)	Diff. (%)	Nominal Flow Rates	
	delta P	(VLPM)			Lower Limit (LPM)	Upper Limit (LPM)
Total Flow Rate	17.06		3.00/13.66 = 16.66		15.0	18.4
Aux. Flow Rate	13.96		13.66			
Main Flow Rate	3.06		3.00		2.7	3.3
Total Flow Rate	17.14		16.66		15.0	18.4

	Sampler	Standard	
		True	Raw
Amb Temp	20.3		20.7
Amb Press	873	884.35	887.2


Comments:

Calibrated By: *M. H.*



GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

MEMORANDUM

DATE: January 14, 2011  
TO: Chris Lanane, Scott Weaver  
FROM: Mike Horn   
SUBJECT: Quality Assurance Audit Report

Attached is the draft version of the document, "Great Basin Unified Air Pollution Control District Quality Assurance Audit Report, Stanley Site, January 14, 2011," for your review. Please refer any comments you may have on the document to me by March 14, 2011. If no comments are received by that date, the report will be considered final.

Thank you for your cooperation in this matter.

Great Basin Unified Air Pollution Control District  
Quality Assurance  
Audit Report

**SITE:**  
**STANLEY SITE**

Report Date: January 14, 2011  
Prepared by: Mike S. Horn

## 1.0 Introduction

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In keeping with the District's QA program goals, the T.E.O.M. PM-10 Monitoring Station at Stanley was audited on January 12, 2011. The audit was conducted by Mike Horn and was witnessed by Scott Weaver, who is the site operator.

## 2.0 Parameters Audited:

T.E.O.M. PM-10

## 3.0 Results and Actions

The results of the audit are summarized below. Any problems found are addressed under the heading, "Action," and are given below. Sensor responses not specifically addressed below responded within the audit criteria limits. The audit data are presented in detail in Appendix A. The certifications of the audit devices are presented in Appendix B. Audit criteria based on Title 40 code of Federal Regulations Part 58, Appendix A (October 2006), the USEPA Quality Assurance Handbook for Air Pollution Measurement Systems Volumes II, 1997, and IV, 2007, and/ or on the manufactures recommendations, are presented in table A-1.

## 4.0 Recommendations and Comments

There are no recommendations or comments at this time.

## APPENDIX A

Great Basin Unified Air Pollution Control District  
Tapered Element Oscillating Microbalance (TEOM)  
AUDIT

Date of report: 1/14/11	Site name: Stanley Site
Date: 1/12/11	Operator: Scott Weaver
Start: 13:05hrs. PST	Project: SB 270
Finish: 13:25hrs. PST	Site Elevation: N/A ft.
Audited By: Mike Horn	Amb. Pres.: 901.60 hPa
Witness: Scott Weaver	Amb. Temp.: 8.6 deg. C
Prop. or Serial No.: N/A	Make: R & P
Type: PM-10	Model: 1400ab
	Last cal. date: 12/7/10

AUDIT DEVICE(S)

Make: BGI Incorporated  
Model: DELTA CAL  
S/N: 525  
Range: 2 - 20 lpm

Make: BGI Incorporated  
Model: DELTA CAL  
S/N: 123  
Range: 2 - 20 lpm

Calibration Factors

Slope: 1.00  
Intercept: 0.00  
Cal Date: 12/22/10 Date of first use 1/12/11

Slope: Calibration Factors  
Intercept: 1.00  
Cal Date: 0.00  
12/22/10

	Main:	Aux:	Sampler temp:	<u>Diff.</u>	Sampler press:	<u>Diff.</u>
Leak check:	0.100	0.140	7.9	-0.7	901.57	0.0
Pump off leak check:	N/A	N/A				

$$Qa=[dPxTa/Pa]^{1/2}+b$$

Audit Point	Audit Flow Rate, $Qa=[dPxTa/Pa]^{1/2}+b$		Site Flow Rate (VLPM)	Diff. (%)	Nominal Flow Rates	
	$\Delta P$ , in. H <sub>2</sub> O	(VLPM)			Lower Limit (LPM)	Upper Limit (LPM)
Total Flow Rate	17.02	17.02	16.67	-2.1	15.0	18.4
Bypass/ Aux Flow Rate	13.96	13.96	13.67	-2.1		
Main Flow Rate	3.09	3.09	3.00	-2.9	2.7	3.3
Total Flow Rate	16.96	16.96	16.67	-1.7	15.0	18.4

Comments: None.

TABLE A-1

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT  
QUALITY ASSURANCE PERFORMANCE AUDIT CRITERIA

<u>Measurement Variable</u>	<u>Evaluation Criteria</u>
Wind Speed	At $w_s \leq 5$ m/s, input $\pm 0.25$ m/s; At $w_s > 5$ m/s, input $\pm 5\%$ Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor and NRG Max 40H
Wind Direction	input $\pm 5^\circ$ Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor
Temperature	input $\pm 0.5^\circ$ C input $\pm 2.0^\circ$ C for PM-10, PM-2.5 samplers
Relative Humidity	Ambient: input $\pm 5\%$ RH, $\pm 1.5^\circ$ C as dew point Gravimetry Lab: input $\pm 5\%$
Precipitation	input $\pm 10\%$
Barometric Pressure	Ambient: input $\pm 10$ hPa TEOM: $\pm 10$ mm mercury
PM-10: Hi-Vol SSI, Partisol, BGI, PM-2.5	input $\pm 10\%$ ; Design Flow $\pm 10\%$ input $\pm 4\%$ ; Design Flow $\pm 5\%$
TEOM: Total Flow Main Flow Bypass Flow	input $\pm 10\%$ ; Design Flow $\pm 10\%$ input $\pm 10\%$ ; Design Flow $\pm 10\%$ input $\pm 10\%$ ; Design Flow $\pm 10\%$
TEOM: Leak Check	Main Flow: $< 0.15$ LPM Bypass Flow: $< 0.60$ LPM

## Appendix B

### GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT QUALITY ASSURANCE CERTIFICATIONS OF AUDIT DEVICES

#### AUDIT DEVICE

	<u>Serial #</u>	<u>Cal Date:</u>	<u>Slope:</u>	<u>Intercept:</u>
BGI Delta CAL:      Date of first use 1/12/11	123	12/22/09	1.0	0.0
BGI Delta CAL:	525	1/4/11	1.0	0.0
Testo 735-1	01467895/712	12/16/10	1.0006	0.0209
Barigo Altimeter/Barometer:	P9	12/17/10	1.0	0.0
RM Young wind speed motor:	CUO1, HSO1	12/3/10	N/A	N/A
Cole-Parmer 3312-40 Psychrometer:	RH 03	12/10/04	Wet 1.0037	Wet -0.0598
			Dry 1.0059	Dry -0.1518
Texas Electronics FC-525 Precipitation:	52202	N/A		

**Great Basin Unified Air Pollution Control District  
Tapered Element Oscillating Microbalance (TEOM)**

**FLOW AUDIT**

Date: 1/12/11  
Start: 13:25  
Finish: 13:25

PST  
PST

Site Name: Stanley  
Operator: Scott Pearson  
Project: SB270

Site Elevation: ft  
Amb. Press.: 901.6 in. Hg  
Amb. Temp.: 8.6 deg. C

Prop. Or Ser. No.: 793/23573  
Type: PM10

Make: R&P  
Model: 1400a  
Last Cal. Date: 12/7/10

**Audit Device(s)**

Make: BGI INCORPORATED  
Model: DELTA CAL  
S/N: 0123  
Range: 2 - 20 lpm  
Calibration factors:  
Slope: 1.0  
Int.: 0.0  
Cal Date: 12/22/07

Make: BGI INCORPORATED  
Model: DELTA CAL  
S/N: 0123  
Range: 2 - 20 lpm  
Calibration factors:  
Slope: 1.0  
Int.: 0.0  
Cal Date:

$$Q_s = m[dP \times T_s / P_s]^{1/2} + b$$

Altitude Correction Factor:  $\div 1013$

Leak Check-Initial Main: .10 Aux: .14  
Leak Check-Final Main: Aux:

Audit Point	Audit Flow Rate		Site Flow Rate (VLPM)	Diff. (%)	Nominal Flow Rates	
	delta P	(VLPM)			Lower Limit (LPM)	Upper Limit (LPM)
Total Flow Rate	17.82		3.00/13.67 = 16.67		15.0	18.4
Aux. Flow Rate	13.96		13.67			
Main Flow Rate	3.89		3.00		2.7	3.3
Total Flow Rate	16.96		16.67		15.0	18.4

	Sampler	Standard	
		True	Raw
Amb Temp	7.9		8.6
Amb Press	890	901.57	901.6

Comments:

Calibrated By:

*Mah*